

# PROJECT FACT SHEET

**CONTRACT TITLE:** Optimization of Horizontal-Well Completions

**ID NUMBER:** 75-98SW00008

**B&R CODE:** AC1005000

**CONTRACTOR:** University of Tulsa  
Office of Research

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**PROJECT SITE**

**CITY:** Tulsa                      **STATE:** OK  
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**CITY:**                              **STATE:**

**CONTRACT PERFORMANCE PERIOD:**

1/13/1998 to 1/1/2000  
**PROGRAM:** Supporting Research  
**RESEARCH AREA:**  
**PRODUCT LINE:** DCS

FUNDING (1000'S)	DOE	CONTRACTOR	TOTAL
PRIOR FISCAL YRS	12	172	184
FISCAL YR 1999	12	157	169
FUTURE FUNDS	0	0	0
TOTAL EST'D FUNDS	24	329	353

**OBJECTIVE:** Develop guidelines to optimize the horizontal well performance by controlling the fluid influx along the well length.

**PROJECT DESCRIPTION:**

**Background:** In the early days of horizontal well technology, most wells were completed as open holes. Because it is difficult to stimulate open-hole wells and it is virtually impossible to control production or injection along the length of the well, the Industry trend, nowadays, is away from open-hole completions. Available horizontal well computer models for performance predictions usually neglect the flow impairment because of restricted inflow into a cased or liner completed horizontal well and therefore cannot be used to investigate the influence of well completion. For a complete description of the horizontal well performance, it is essential that - 1) the effect of the flow convergence toward small openings on the well surface be incorporated into the reservoir model; 2) the additional pressure drop caused by the inflow through restricted openings be incorporated into the wellbore flow models; and 3) flow in the reservoir and in the wellbore be rigorously coupled.

When a complete and rigorous horizontal well-reservoir flow model is developed, it can be used to obtain estimates of well performance under different completion scenarios and to derive guidelines for the design of optimum well completions.

**Work to be Performed:** The project will consist of four major phases: Phase I: Model Development, Reservoir Model Development, Wellbore Model Development Coupling of Reservoir, and Wellbore Models. Phase II: Computation Algorithm and Software Development of Computation, Completion Geometries Software Development, Beta Testing of Software. Phase III: Evaluation of Results, Pseudoskin Expression Evaluation of Different Completion Geometries, Pseudo Skin Due to Completion Development of Completion Guidelines. Phase IV: Final Report. The deliverables will be: Phase I: Open-Hole Well Performance Software, Experimental Data and Friction Factor Correlation, Comprehensive Horizontal Well-Reservoir Model. Phase II: User Friendly Horizontal Well Completion Software, One-Day Workshop on the Use of the Software. Phase III: Pseudo Skin Function Due to Completion, Horizontal Well Completion Guidelines. Phase IV: Final Report.

**PROJECT STATUS:**

**Current Work:** Presently, the JIP is in Phase II. Work on the development of the algorithm is in progress.

**Scheduled Milestones:**

## Phase I:

Reservoir Model Development

Reservoir Model Development

Wellbore Model Development

Coupling of Reservoir and Wellbore Models

09/99

## Phase II:

Computation Algorithm and Software

Development of Computation Completion Geometries

10/99

**Accomplishments:** 1) Reservoir model development; 2) friction factor correlation and wellbore model development; and 3) the incorporation of the friction factor correlations into the coupled wellbore reservoir model.

Mr. Yula Tang is working on the coupling of the reservoir and wellbore flow models. Mr. Weipeng Jiang is completing the checks and corrections on the new friction factor correlations. Mr. Weipeng Jiang will be replaced by Arsene Bitsendou in FY2000.